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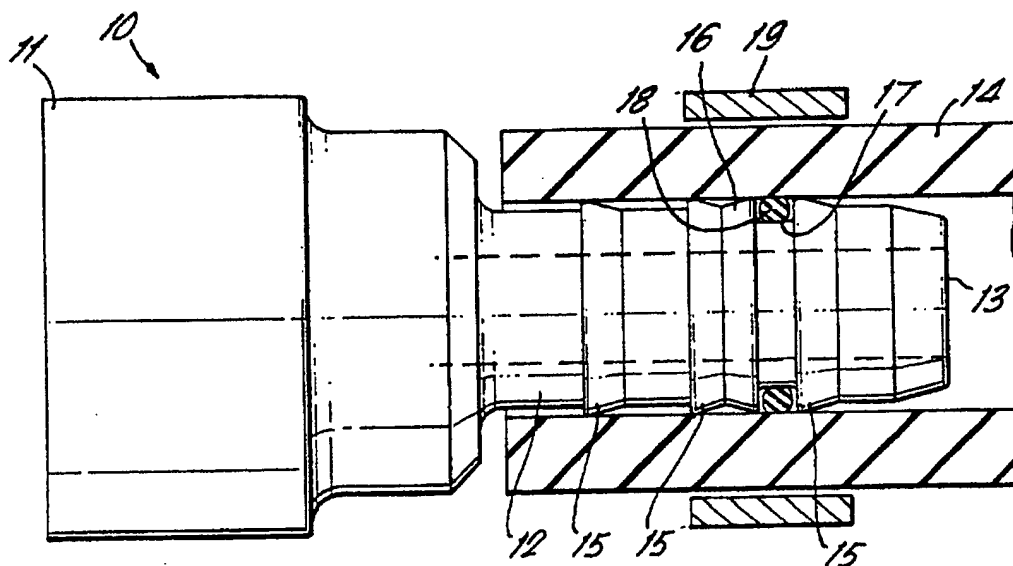
(56) Documents cited  
GB A 2115897 GB 1362454 GB 0855906  
GB 1406054 GB 1083741 GB 0456072

(58) Field of search  
F2G  
Selected US specifications from IPC sub-class F16L

(54) Improvements in or relating to hose connectors

(57) A hose connector comprising an open ended hollow spigot preferably having a number of annular barb-shaped projections 15 encircling the spigot at spaced locations to grip and hold an end of a hose 14 forced over the spigot. In order to resist very high pressures in the hose causing expansion of the hose and escape of fluid between the hose and spigot there is a groove 17 therebetween containing an O-ring seal 18 to engage the inner surface of the hose with an annular clamp 19 encircling and securing the hose.

FIG. 1.



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FIG. 1.

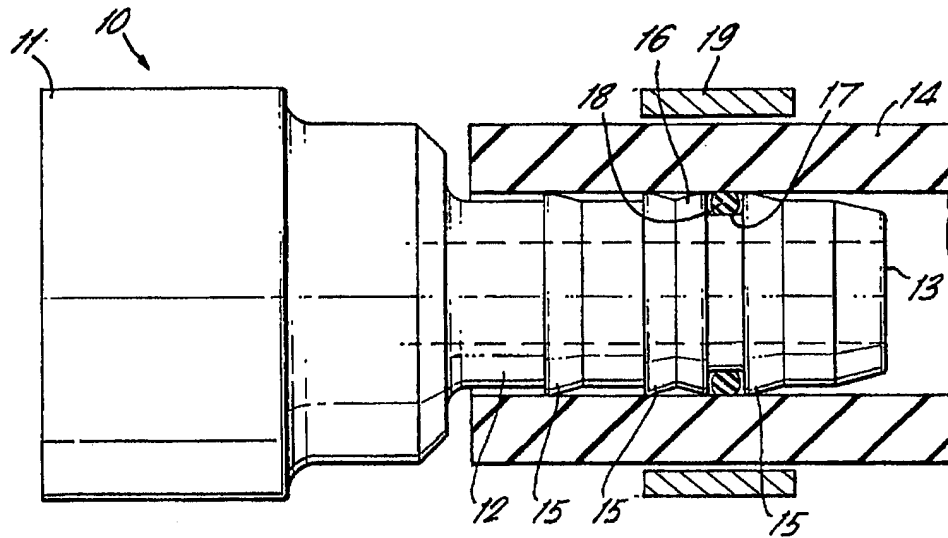
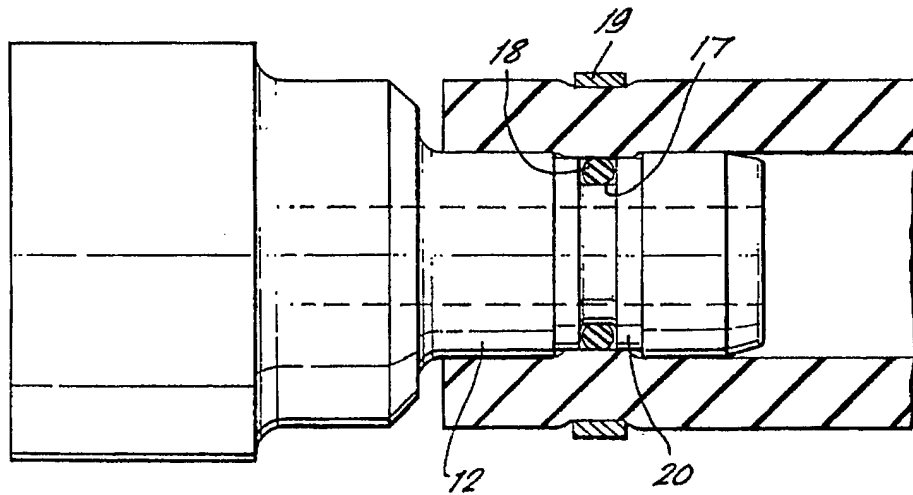


FIG. 2.



## SPECIFICATION

## Improvements in or relating to hose connectors

5 This invention relates to hose connectors and is particularly although not exclusively applicable to connectors for use in conjunction with tube couplings of the type described and illustrated in UK patent specification No. 1520742.

The invention provides a hose connector comprising an open ended hollow spigot to receive an encircling hose, a groove in the external periphery of the spigot spaced from the open end thereof, an O-ring seal disposed in the groove to seal with the groove and the inner surface of a hose on the spigot and an annular clamp for retaining the hose in engagement with the seal and into engagement with the spigot on either side of the groove containing the seal.

In accordance with one construction the spigot is formed with gripping means on its outer surface to grip the inner periphery of the hose on the spigot.

More specifically the grip means may comprise a plurality of annular barb cross section projections encircling the spigot and facing away from said open end of the spigot. Partway along the spigot two barb cross section annular projections may be formed facing towards one another and the annular groove containing the O-ring seal may be disposed between the said projections. In a further construction the spigot may be formed with a shallow recess spaced from said one end thereof and encircling the spigot and the annular groove containing the O-ring seal may be formed within the width of the recess, the annular clamp for encircling the hose around the groove spanning the groove and at least a part of the recess on either side of the groove to force the wall of the hose into the recess to engage both the seal and the surface of the spigot on either side of the groove containing the seal.

In any of the above arrangements the hollow spigot may be formed integrally with one end of a hollow body member which is open at the other end and which has a tube connector therein comprising a collet extending into said open end having resilient fingers to engage a tube inserted through the collet into the body member, the hollow body member being formed with a conical cam surface which tapers towards the open end thereof and with which the resilient fingers of the collet engage to be compressed against the surface of a tube within the collet by movement of a collet towards the open end of the body member to grip and hold the tube in the body member.

The following as a description of some specific embodiments of the invention, reference

being made to the accompanying drawings in which:-

Figure 1 is a diagrammatic view of one form of hose connector/tube coupling according to the invention;

Figure 2 is a diagrammatic view of an alternative form of connector/coupling.

Referring firstly to Fig. 1 of the drawings, there is shown a tube coupling indicated generally by the reference numeral 10 of the type described and illustrated in U.K. Patent Specification No. 1520742. Briefly the coupling comprises a hollow body part 11 open at one end to receive an end part of a tube. The open end contains a collet having a plurality of resilient arms extending into the throughway of the body part the inner sides of which arms are formed with projections to engage the outer surface of the tube and the outer sides of which bear against a frusto-conical surface formed in the body part and tapering towards the open end thereof. Thus movement of a collet in a direction outwardly of the body part causes the resilient arms to converge around the surface of a tube and grip the tube to prevent withdrawal of a tube. One or more O-ring seals are disposed in the throughway in the body part adjacent to the larger end of the cam surface to seal with the outer surface of a tube and prevent loss of fluid through the open end of a body part.

The other end of a body part 10 is reduced in diameter in two steps to form a projecting elongate spigot 12 terminating in an open end 13. A hose 14 of rubber or other rubber like soft material is engaged over the spigot. The spigot 12 is formed with a plurality of annular barb-shaped projections 15 encircling the spigot at spaced locations along the spigot over which the hose is stretched. The barb-shaped projections dig into the surface of the soft rubber hose and the resulting interlocking of the hose with the barb-shaped projection effectively resists disengagement of the hose from the spigot even when high pressure fluids are conducted through the hose. However, very high pressure fluids may cause the hose to expand and allow leakage of fluid between the hose and barbs on the spigot. In accordance with the present invention, a sealing arrangement is provided between the spigot and the hose to prevent such leakage.

An additional annular barb shaped projection 16 is provided on the spigot facing opposite the projection 15 nearest to the open end of the spigot and the spigot is formed with an annular groove 17 between the oppositely facing projections. The groove 17 contains an O-ring seal 18 which projects from the groove and engages the inner surface of the hose between the projections to seal in the groove and with the hose. An annular clamp such as a "Jubilee" or "Oertiker" clip is fitted around the hose over the area of the opposed projections 15 and 16 and the seal 18 to clamp the

hose firmly to the projections on either side of the seal. The resulting clamping action of the hose enhances the grip of the hose with the projection and also enhances the effectiveness of the seal 18.

The above arrangement is particular suitable for use in conditions where widely varying temperature conditions can reduce the effectiveness of a rubber hose held on a barbed spigot. For example, the connector may be used in the fuel supply line of a motor vehicle engine and typically the connector will require to be effective over an operating temperature range of normal atmospheric temperature up to temperatures in excess of 120°C. The rubber hose may form an effective seal on installation of the spigot but will expand as the temperature rises but tends not to contract to its original shape on cooling. Thus, when a rubber hose has been installed on the spigot formed with barb shaped projections, the projections dig in to the hose and initially hold the hose in place but on expansion of the hose, the hose tends to separate from the barb shaped projections and on cooling does not return to full engagement with the projection thereby leaving slight gaps through which fuel can escape. By providing an O-ring seal and clamp arrangement as described above, a permanent effective seal is created between the inner surface of the hose and the spigot to prevent loss of fuel.

Fig. 2 of the drawing shows a modified arrangement in which the spigot surface is formed plain without barb shaped projections. A shallow annular recess 20 is formed around the outer surface of the spigot and an annular groove 17 for an O-ring seal 18 is formed within the width of the recess. The clamping ring 19 encircling the hose around the O-ring seal is wider than the seal but is narrower than the width of the recess so that tightening of the clamp forces the wall of the hose into engagement with the seal and with the spigot in the recess on either side of the groove 17. The arrangement thus provides an effective seal in a similar way to that described in connection with Fig. 1 above.

## 50 CLAIMS

1. A hose connector comprising an open ended hollow spigot to receive an encircling hose, an groove in the external periphery of the spigot spaced from the open end thereof, an O-ring seal disposed in the groove to seal with the groove and the inner surface of a hose on the spigot and an annular clamp for retaining the hose in engagement with the seal and into engagement with the spigot on either side of the groove containing the seal.

2. A hose connector as claimed in claim 1 wherein the spigot is formed with gripping means on its outer surface to grip the inner periphery of the hose on the spigot.

3. A hose connector as claimed in claim 2

wherein the grip means comprise a plurality of annular barb cross section projections encircling the spigot and facing away from the said open end of the spigot.

4. A hose connector as claimed in claim 3 wherein part way along the spigot two barb cross section annular projections are formed facing towards one another and the annular groove containing the O-ring seal is disposed between the said projection.

5. A hose connector as claimed in claim 1 wherein the spigot is formed with a shallow recess spaced from said one end thereof and encircling the spigot and the annular groove containing the O-ring seal is formed within the width of the recess, the annular clamp for encircling the hose around the groove spanning the groove and at least a part of the recess on either side of the groove to force the wall of the hose into the recess to engage both the seal and the surface of the spigot on either side of the groove containing the seal.

6. A hose connector as claimed in any of the preceding claims wherein the hollow spigot is formed integrally with one end of a hollow body member which is open at the other end and which has a tube connector therein comprising a collet extending into say open end having resilient fingers to engage a tube inserted through the column into the body member, the hollow body member being formed with a frusto-conical cam surface which tapers towards the open end thereof and with which the resilient fingers of the collet engage to be compressed against the surface of a tube within the collet by movement of the collet towards the open end of the body member to grip and hold the tube in the body member.

7. A hose connector substantially as described with reference to and as illustrated in Fig. 1 of the accompanying drawings.

8. A hose connector substantially as described with reference to and as illustrated in Fig. 2 of the accompanying drawings.